DOCUMENT RESUME

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IDENTIFIERS	*ABCs of Construction Project; *Pipe Fitters; Workplace Literacy

ABSTRACT

Developed by the ABCs of Construction National Workplace Literacy Project, these curriculum materials for the occupational area of pipefitter contain a lesson that deals with measuring fractions. The lesson consists of an instruction sheet and three exercises with answer keys. (YLB)

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ED 374 312

TECHNICAL DEVELOPMENT CENTER

Measuring Fractions

Pipefitter

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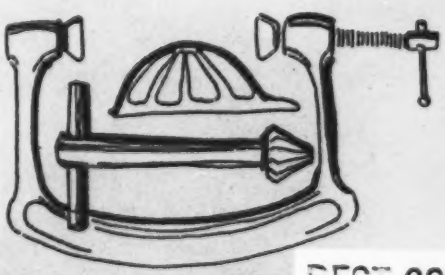

Associated Builders & Contractors, Inc.
EBR Adult & Continuing Education

CE 067 250

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ABC's of Construction
National Demonstration Project in Workforce Literacy

The ABC's of Construction Project was funded in 1991 by the U.S. Department of Education as a grantee through the National Workplace Literacy Program (PR #198A10155). The program provided basic skills instruction to industrial construction workers employed by companies which are members of the Pelican Chapter of Associated Builders and Contractors (ABC). Located in Baton Rouge, Louisiana, ABC provides training to employees of over 60 member companies who perform contract work in the 58 petrochemical facilities located along the Mississippi River between Baton Rouge and New Orleans.

The grantee, the Adult Education Department of East Baton Rouge School Board, performed a comprehensive literacy task analysis of the apprenticeship training program for millwrights, pipefitters, electricians, instrumentation techs, and welders involved in the ABC training program. Over 20 modules of original, contextual curriculum were developed to teach the reading and math skills required for success in the craft training program.

Materials developed for instruction incorporated cognitive strategies for learning basic skills in the context of the craft and safety knowledge demanded by the industrial construction workplace. Instruction was written for a competency-based, open-entry/open-exit, individualized adult learning program that operated at the ABC training center in the evenings after work-hours.

What is a Fraction?

A fraction has two parts: a top and a bottom. The top is called a numerator. The bottom is called a denominator.

example: $\frac{\text{numerator}}{\text{denominator}}$

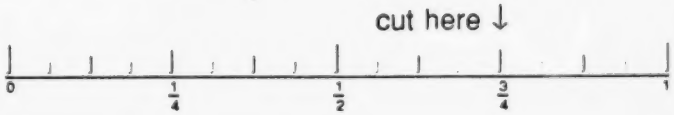
$\frac{1}{4}$

In the above example ¼, the 1 means you have 1 part, and the 4 means that it would take 4 parts to make a whole.

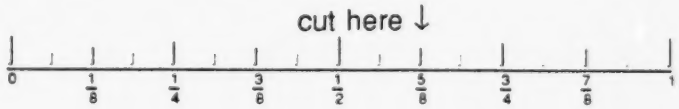
If you were measuring the length of a pipe, ¼" would mean you would cut the piece on the outside edge of the ¼" mark.

Let us look at other examples:

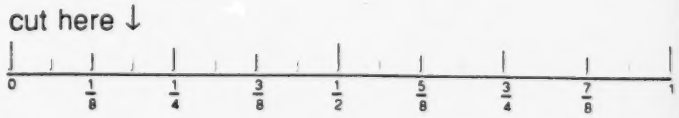
$\frac{3}{4}$



$\frac{5}{8}$



$\frac{3}{16}$



Again, if you were cutting a pipe, you would not center your blade on top of the mark but on the outside edge of the mark because your blade is probably ⅛ wide (if you place it centered on the mark, the blade would take off some of the length you need).

Measuring Fractions
Exercise I for Pipefitters

Pipefitters need to know and understand the fractions used in measuring lengths of pipe. To help you refresh your memory of fractions, use the "Construction Inch", a big model of an inch, to help you see and feel the differences between fractions in the following problems. Answers to the questions below are found in the "Answer Key" section.

1. Find blocks of wood that are marked: 1/2, 1/4, 1/8, 1/16.

   a. Which block is the biggest?

   b. Which block is the smallest?

   c. Is 1/2 bigger or smaller that 1/4?

   d. Put these wood blocks in order with the smallest to the left and the biggest to the right. What order would this be?

2. Use the wood blocks to make an inch.

   a. How many 1/2" does it take to equal 1" ?

   b. How many 1/4" does it take to equal 1" ?

   c. How many 1/8" does it take to equal 1" ?

   d. How many 1/16" does it take to equal 1" ?

3. Place the wood blocks in the "Construction Inch" or directly behind it to help see the answers to the following questions.

   a. Add 1/8 + 1/8 + 1/8.
   Is this bigger or smaller than 1/4 + 1/4 + 1/4 ?

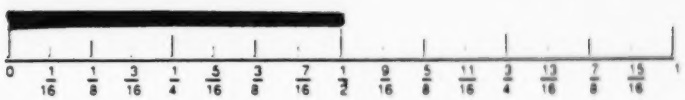
   b. Which is smaller, 5/16 or 5/8 ?

   c. Which is bigger, 1/4 or 3/16 ?

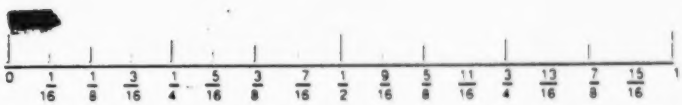
   d. Add 1/4 + 1/4. Is this bigger, smaller, or the same as 1/2 ?

Measuring Fractions
Answers to Exercise I for Pipefitters

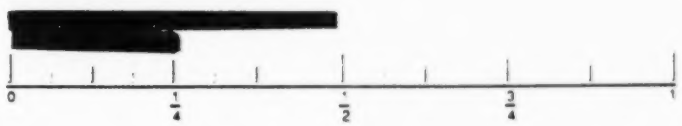
1. a. 1/2 is biggest



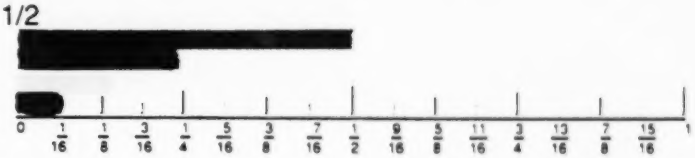
b. 1/16 is smallest



c. 1/2 is bigger than 1/4

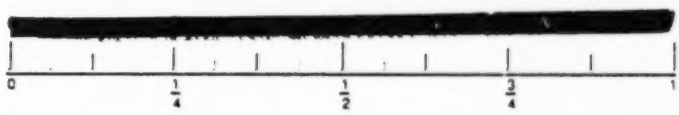


d. Smallest to biggest would be 1/16, 1/8, 1/4, then 1/2



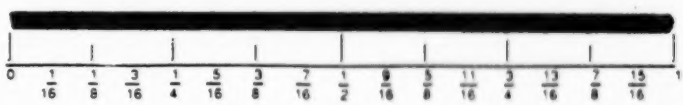
2. a. 2 (2 x 1/2" = 1")

b. 4 (4 x 1/4" = 1")



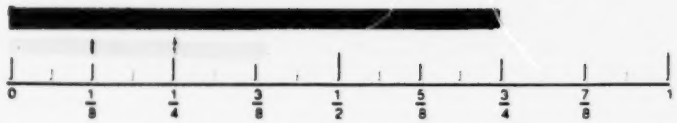
c. 8 (8 x 1/8" = 1")

d. 16 (16 x 1/16" = 1")



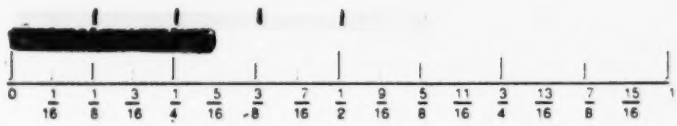
3. a. 3/8 is smaller than 3/4

1/8 + 1/8 + 1/8 = 3/8

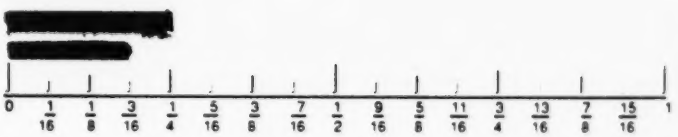


1/4 + 1/4 + 1/4 = 3/4

b. 5/16 is smaller than 5/8

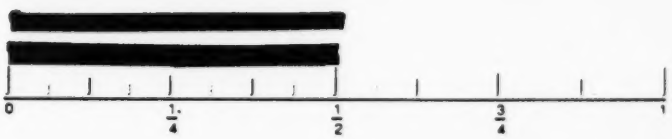


c. 1/4 is bigger than 3/16



d. It is the same

1/4 + 1/4 = 1/2



Measuring Fractions
Exercise II for Pipefitters

To help you with the problems below, use one or both of the "Construction Inch" models to help you see and feel the differences in fractions discussed. Answers to the questions can be found in the "Answer Key" section.

1. Compare the sizes of 1/2, 1/4, 1/8, and 1/16.

   a. How many 1/16's are equal to 1/8 ?

   b. How many 1/16's are equal to 1/4 ?

   c. How many 1/16's are equal to 1/2 ?

2. The fraction 1/2 can be written in other ways.

   a. How many 1/4's equal 1/2 ?

   b. How many 1/8's equal 1/2 ?

   c. How many 1/16's equal 1/2 ?

3. Using the "Construction Inch" model, how many 1/8's are equal to these fractions?

   a. The fraction 1/2 ?

   b. The fraction 3/4 ?

   c. The fraction 4/16 ?

4. Which is bigger in each of the following problems? (Use the "Construction Inch" to compare the two measurements.)

   a. 2/16 or 1/4 ?

   b. 3/16 or 1/8 ?

   c. 4/16 or 4/8 ?

   d. 3/8 or 3/4 ?

Measuring Fractions, Exercise II continued

5. Which is the smaller in each of the following measurements?

   a. 5/8" or 5/16" ?

   b. 7/16" or 1/2" ?

   c. 1/4" or 3/16" ?

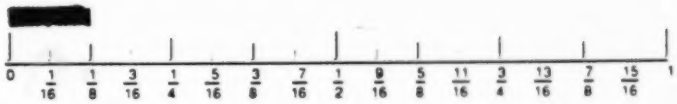
   d. 5/16" or 3/8" ?

6. Make up some problems. Use the "Construction Inch" model to check your answers.

Measuring Fractions
Answers to Exercise II for Pipefitters

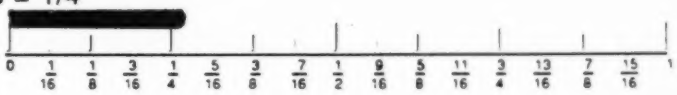
1. a. 2 (2 x 1/16 = 1/8)

1/16 + 1/16 = 1/8



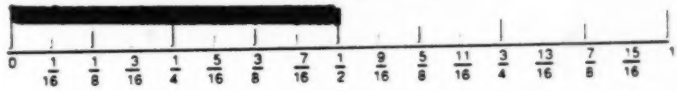
b. 4 (4 x 1/16 = 1/4)

1/16 + 1/16 + 1/16 + 1/16 = 1/4



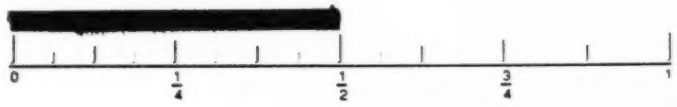
c. 8 (8 x 1/16 = 1/2)

1/16 + 1/16 + 1/16 + 1/16 + 1/16+ 1/16 + 1/16 + 1/16 = 1/2



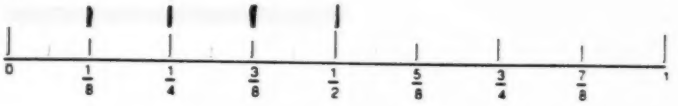
2. a. 2 (2 x 1/4 = 1/2)

1/4 + 1/4 = 1/2



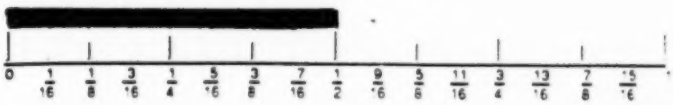
b. 4 (4 x 1/8 = 1/2)

1/8 + 1/8 + 1/8 + 1/8 = 1/2

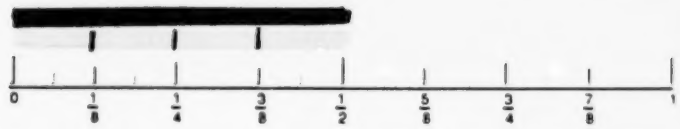


c. 8 (8 x 1/16 = 1/2)

1/16 + 1/16 + 1/16 + 1/16 + 1/16+ 1/16 + 1/16 + 1/16 = 1/2



3. a. 4 (4 x 1/8 = 1/2)

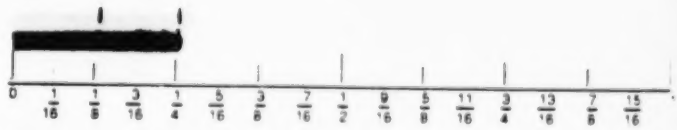


1/8 + 1/8 + 1/8 + 1/8 = 1/2

b. 6 (6 x 1/8 = 3/4)

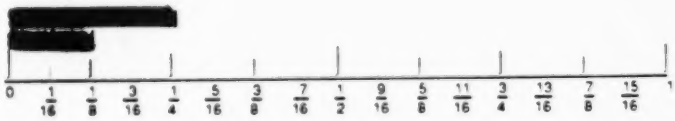
1/8 + 1/8 + 1/8 + 1/8 + 1/8 + 1/8 = 3/4

c. 2 1/16 + 1/16 = 1/8 so

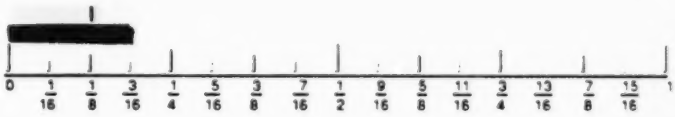


1/16 + 1/16 + 1/16 + 1/16 = 2/8

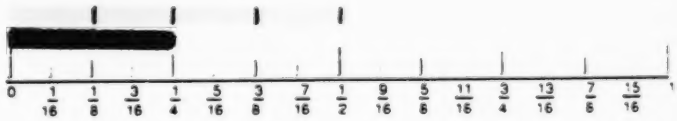
4. a. 1/4 is bigger than 2/16



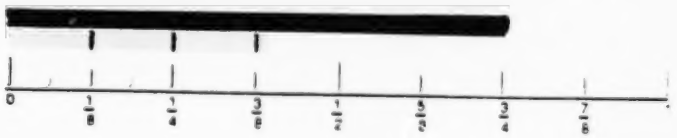
b. 3/16 is bigger than 1/8



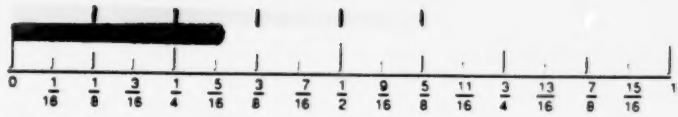
c. 4/8 is bigger than 4/16



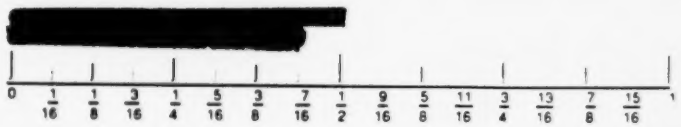
d. 3/4 is bigger than 3/8



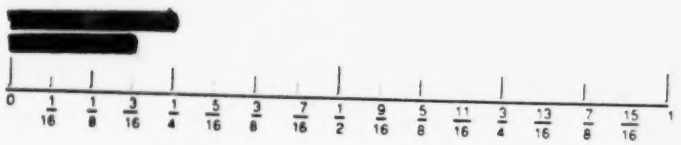
5. a. 5/16" is smaller than 5/8"



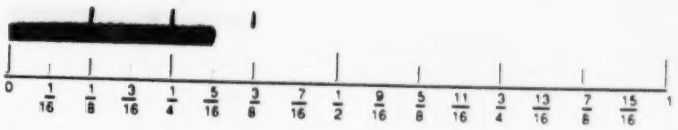
b. 7/16" is smaller than 1/2"



c. 3/16" is smaller than 1/4"



d. 5/16" is smaller than 3/8"



6. Check your problems using the "Construction Inch."

Measuring Fractions
Exercise III - Practice Problems
Pipefitters

Below are problems pipefitters are asked to solved in their work. Use the model "Construction Inch" if it will help you answer these questions. Look to the "Answer Key" to check your work.

1. John has a 10 3/4" PVC pipe. His supervisor told him to cut it 1/2" shorter. How long should the pipe be after it is cut?

   The problem would be written: 10 3/4" - 1/2" = ?

   Hint: 1/2" is equal to how many 1/4" ?

2. Jessie was told by her supervisor to take 3/16" off a pipe that was 8 1/2" long. How long should the pipe be?

   The problem would be written: 8 1/2" - 3/16" = ?

   Hint: 1/2" is equal to how many 1/16's ?

3. Bubba was told to get a pipe from the pile that was the one nearest to 11 3/16" long. He found pipes that were 11 3/8", 11 1/16", and 11 3/4". Which pipe is the one he should have selected?

   The problem would be to decide how much is 3/16" from 3/8", 1/16" or 3/4" ?

   Hint: Change all the fractions to 1/16's then subtract or add to figure which is closer.

4. Winton's supervisor needed a pipe which has a 3 1/2" diameter. He found the following pipes. Which one is the correct one?

   a. 3 7/16" b. 3 4/8" c. 3 3/4" d. 3 9/16"

   Hint: Change all the fractions (including 1/2") to x/16's.

5. Pam needed two pipes that are 9 3/8" long. Could she cut these two pieces of pipe from a pipe that is 18 1/2" long?

   Hint: Change the 1/2" to ?/8's. Is 9 3/8" + 9 3/8" bigger, smaller or the same as 18 1/2"?

6. If Dan cut 4 3/8" off a pipe that is 24 7/16", could he use it for a job that needed a pipe 20 1/4" long?

   Hint: Change all the fractions to 1/16's. Subtract.

7. Could Billie get a piece of pipe 30 1/4" from a 30 3/16" pipe?

   Hint: How many 1/16's are is 1/4" ?

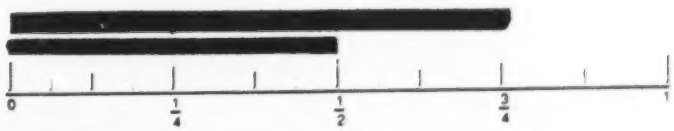
8. Make up some problems using 1/2's, 1/4's, 1/8's and 1/1/6's. If you have any questions on how these fractions compare to each other, or which ones are equal, ask a teacher to assist you. Use the "Construction Inch" to work your problems.

Measuring Fractions
Answers to Exercise III for Pipefitters

1. 10 3/4"

   --1/2"

   10 1/4"



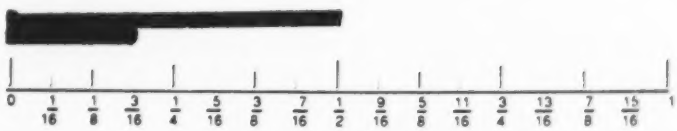
10 3/4 = 10 + 1/4 + 1/4 +1/4

1/2 = 1/4 + 1/4

2. 8 1/2"

   - 3/16"

   8 5/16"



8 1/2 = 8 + 1/16 + 1/16 + 1/16 + 1/16 + 1/16 + 1/16 + 1/16 + 1/16

3/16 = 1/16 + 1/16 + 1/16

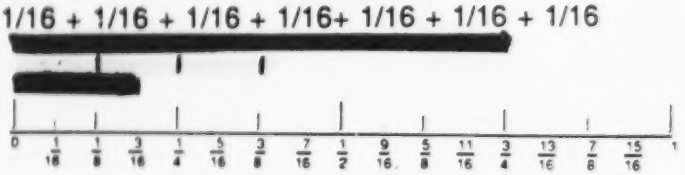
3. **11 1/16"** is the most like the 11 3/16"

11 3/16 = 11 + 1/16 + 1/16 + 1/16

11 1/16 = 11 + 1/16

11 3/8 = 11 + 1/8 + 1/8 + 1/8 or
11 + 1/16 + 1/16 + 1/16 + 1/16 + 1/16 + 1/16

11 3/4 = 11 + 1/4 + 1/4 + 1/4 or
11 + 1/8 + 1/8 + 1/8 + 1/8 + 1/8 + 1/8 or
11 + 1/16 + 1/16 + 1/16 + 1/16 + 1/16+ 1/16 + 1/16 + 1/16

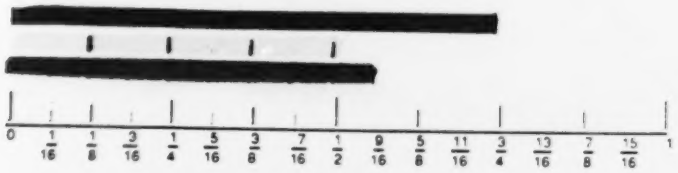


4. b. **3 4/8" is equal to 3 1/2"**

a. 3 7/16 = 3 + 1/16 + 1/16 + 1/16 + 1/16 + 1/16+ 1/16 + 1/16

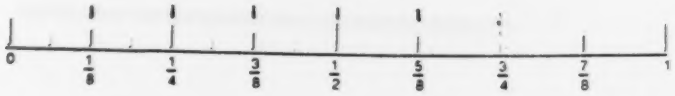
c. 3 3/4 = 3 + 1/4 + 1/4 + 1/4 or
3 + 1/16 + 1/16 + 1/16 + 1/16 + 1/16 + 1/16 + 1/16 + 1/16
+ 1/16 + 1/16 + 1/16 + 1/16

d. 3 9/16 = 3 + 1/16 + 1/16 + 1/16 + 1/16 + 1/16+ 1/16 + 1/16
+ 1/16 + 1/16



5. **No**

9 3/8" + 9 3/8" = 18 6/8" which is 2/8" longer than 18 1/2"

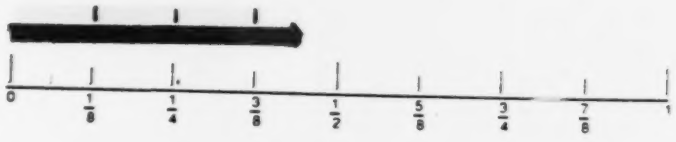


6. **No**

24 7/16"

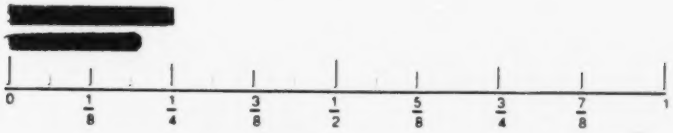
-4 3/8"

20 1/16" (which is 3/16" longer than 20 1/4")



7. **No**

30 3/16" is 1/16" smaller than 30 1/4"



8. Use the "Construction Inch" when working your problems.